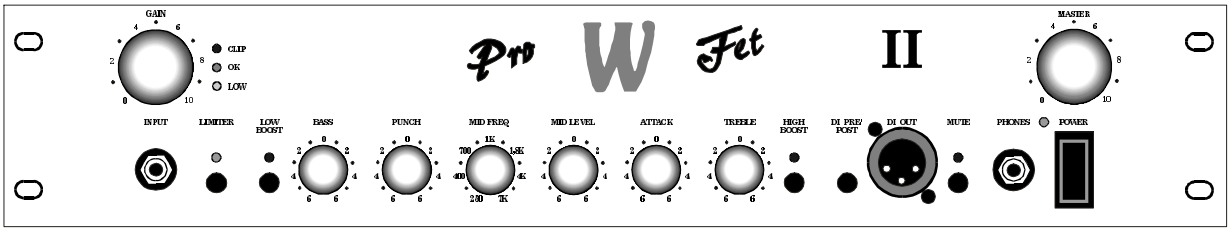
Letzte Änderung
Last alteration 02.1999

Pro Fet II

Pro Fet II Front



Pro Fet II Rear

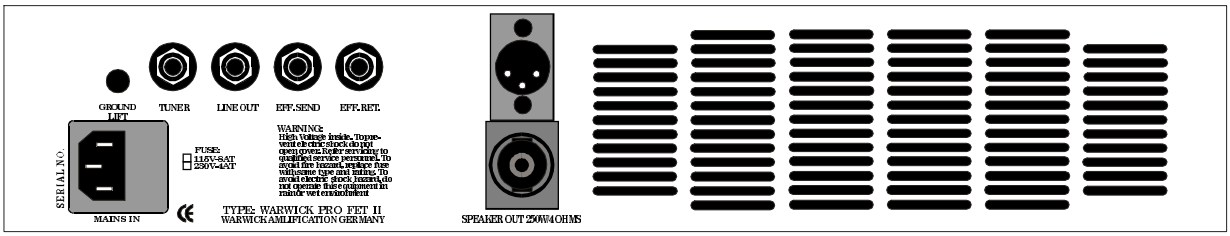


Table of Contents

· Main supply..... 230 V / 115 V

· Speaker Out..... 250 W / 4 Ohm

· Input..... 25 mV

· Frequency Filter

LOW BOOST	BASS	PUNCH	MID FREQ.	MID LEVEL	ATTACK	TREBLE	HIGH BOOST
30 Hz +10dB	**75 Hz** -12,5...12,5dB	**230 Hz** -12...12dB	250Hz bis 7kHz	-12,5 dB bis +12.5dB	**2 kHz** -12...12dB	**6,5 kHz** -12...12dB	**25 kHz** -12...12dB

· Headhpone.....200 Ohm,stereo

· Direct Out.....0 dBu, 600 Ohm

· Effects Loops.....mono serial
send 0 dBu, 600 Ohm
return 0 dBu, 10 kOhm

· Switches..... ground lift
DI pre/post

· Dimensions (W/H/D)..... 483mm x 90mm x 375mm

· Weight .... 11,5 kg

1.2 Measuring devices/methods

Variable transformer
Oscilloscop
Ton generator
Multimeter
Stabilised-DC pwer supply (0V... ±10V)
Loadresistance (4 ohms / 250W)

Please read the safety instructions on the rear panel before opening the device. Above all, be sure to disconnect the device from the mains before commencing any repair work. Special care must be taken when working in the power amplifier areas as DC voltages in excess of >140V (power amplifier) may be present. The normal precautions should be observed when working with MOS elements

1.4 Components and spares

Any parts that prove defective should only be replaced by original spare parts as the use of substitute types could result in a shifting of the operating point, with the result that the correct operation of the device can no longer be guaranteed. This is especially true in the area of the power amplifier where components have been precisely measured

1.5 Accuracy of measurements

The measurements documented in the circuit specifications are to be understood as approximate values. Any deviation from the stated values should not, however, exceed 10%. The oscillograms for themeasurement points (exceptMP7)beginatpage17.

1.6 Dismantling instructions

Front Panel

To remove the front panel, first loosen the screws highlighted in black.
Then remove the power supply cable and accompanying cable fasteners from inside the device.

Power Amplifier

In order to dismantle the power amplifier, loosen the screws marked in grey in Fig. 2. Then the cables that are plugged in should be removed before the soldered cables are separated from their contacts.

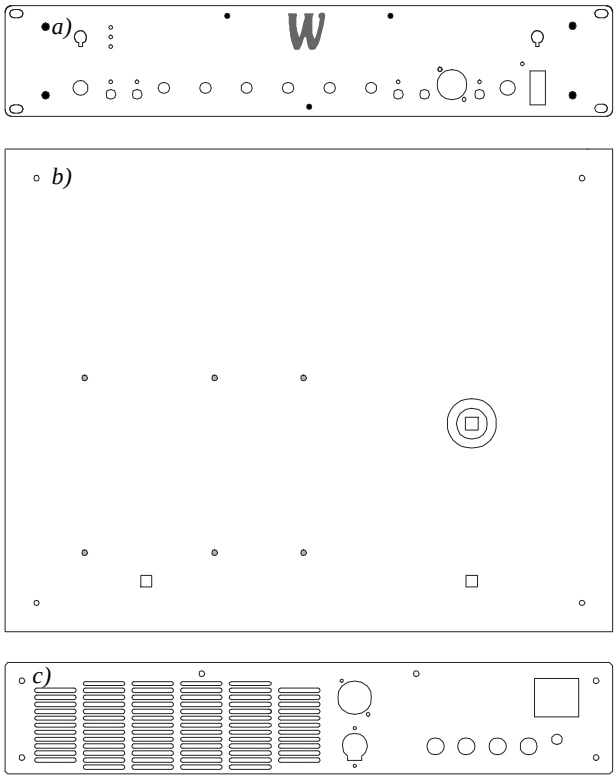


Fig. 2.: Position of the srews
a) front panel; b) base; c) rear panel

To conduct a test on a Warwick ***Pro Fet II*** with the measuring data given below, you must first set the variable parameters in the channel strips to what will henceforth be described as their LINEAR configuration.

Gain \ Master	10
Limiter \ Mute	OFF
Low Boost \ High Boost	OFF
Bass \ Punch \ Mid Level \ Attack \ Treble	0

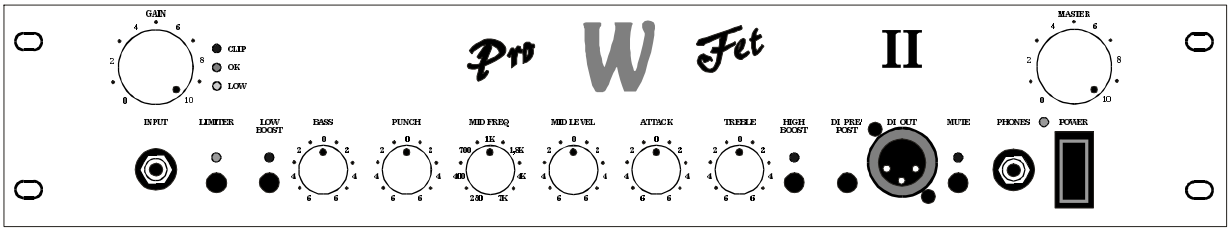


Bild 3.: Pro Tube II Basic configuration

NOTE: *An effective examination of the* ***Pro Fet II*** *can only be carried out using a frequency analyser. The graphs needed for the evaluation begin on page 18.*

2.2 Preamp

Testing the filter

To test the filters (Low Boost, Bass, Punch, Mid, Attack, Treble, High Boost) a tone generator is connected to the input and the controls of the ***Pro Fet II*** are set to their LINEAR configuration. The signal is measured using an oscilloscope at the ***Effects Send*** output.
The filter to be tested is first turned all the way to the right (see the "***Boost***" table) and then all the way to the left (see the "***Cut***" table). When testing the Mid filter, you also have to set the cutoff frequency (250, 7k).

Input Vss/mV	Filter Options	Filter Frequency f/Hz	Boost *(+6)* U/Vss	Cut *(-6)*
10	Low Boost	30	1,4	/
10	Bass	70	1,5	88m
10	Punch	230	1,5	92m
10	Mid Level (250)	250	1,8	80m
10	Mid Level (7k)	7,2k	1,7	80m
10	Attack	2,1k	1,5	96m
10	Treble	6,8k	1,6	96m
10	High Boost	25k	1,8	/

Once the filter to be tested has been activated, the frequency with the greatest degree of amplification must be determined. This is then compared w ith the data in the adjacent table and should deviate by nomorethan ±15%.

Instructions concerning the Limiter, Gain

To test these LEDs, the controls of the ***ProFetII*** must be in their LINEAR configuration.
The switching levels of these LEDs are set out in the circuit diagram for the preamp.
To test the Gain and Limiter LED, a sine wave signal of approximately 1kHz, variable in its amplitude, is applied to the input.
The signal is measured using an oscilloscope at ***PIN-7*** or ***6*** of ***IC1***. The input signal is then increased until the switching point of the yellow LED is reached. The measurement taken at ***IC1*** is then compared with the level given in the circuit diagram. The input signal is then increased still further so that the OK and Clip LEDs can be tested in the same manner.
To test the Limiter, first activate it and then proceed in the same manner as before.

Used Measuredevices.
Generator: Wavetek
Model 188-S-1257
4MHz Sweep / Function Generator

Oscilloscop: Goldstar
Oscilloscope OS-7040A 40MHz

When the device is switched on, there should be a noticeable delay before it powers up. You should be able to hear the relay operating. The length of the delay should be about two seconds.

TTENTION: *If it becomes neccesary to replace a broken power amp transistor, it´s strongly recommendet to use original spare parts supplied by the maufacturer only. Also, even in case of ONE broken power amp transistor, you should replace the whole set, which means 2x* ***IRFP9240*** *or 2x* ***IRFP240.***

DC Voltage Protection

The following procedure is used to test the circuit that protects against DC voltage at the output:

- ·Switch off the device
- ·Removed fuses ***Si1*** to ***Si2*** (*take care to discharge the input capacitors*)
- ·Connect a multimeter to the emitter of transistor T17 (*1V range*)
- ·Connect a stabilised DC source (*set to 0V*) to the output
- ·Switch on the ***ProFetII***

Now slowly raise the DC voltage at the ***Pro Fet IV***s output (positive and negative tests) until the device is seen to switch off (the Mute LED will illuminate and the relay will switch off). When the switch-off occurs, the voltage at T17 should be c. 0.6V.
If the ***Pro Fet II*** has not switched off by the time the DC source voltage reaches 3V, there is a fault.
Note that there is an electrolytic capacitor in the protective circuit to ensure a sluggish response. That is why it is essential to increase the voltage slowly. The external DC voltage is interrupted when the relay switches off and after a short interval, during which the power amplifier will be in Standbymode,itwillreturntoOperatingmode .

Temperature control

Before performing this test, the stabilised DC voltage power supply should be set to +8V.
The simplest way of connecting the Earth is to connect it to the ***Speaker Out*** (Minus). The other output of the voltage source is connected to NTC2. (*Attention: one pin of NTC 2 is connected to Earth*)
The following table shows how the protective circuit reacts at various operating points.
Here too it should be borne in mind that the stated voltage values are approximations and a variation of + or - 10% is permissible.

Fan ON	6V
Standby ON	3,5V
Standby OFF	4,5V
Fan OFF	7,5V

Short-circuit protection

When testing the short-circuit protection, a 4ohm (250W) load resistance is attached to the ***Speaker Out*** of the amplifier and an additional 1 (250 W) ohm load resistance to the earth of the output (see Fig. 4) A sine wave signal of c. 1kHz should be applied to the ***Effects Return*** and increased until the oscilloscope at the output shows

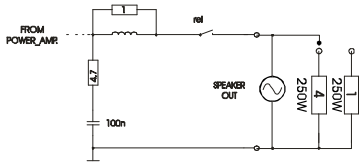


Fig. 4.: Short-circuit test (SPEAKER OUT)

72V(peak-to-peak) (Master: **10**). The output should then be connected with the 1ohm resistance. Directly afterwards, the ***Pro Fet II*** should switch to Standby mode and remain there until it is switched off.

NOTE: I*f the load resistance can be varied to 2 ohms, the output stability can also be tested. For this purpose, the output must be connected to the 2 ohms load resistance, but the power amplifier must not be allowed to switch over to Standby mode before 15Veff.*

2.3 Power amp / Parameters

Trimming the quiescent current

The quiescent current is balanced using the parallel connected resistors R1 || R2 .
To set the quiescent current a digital multimeter is also connected to the resistors R1 || R2 to measure the voltage drop.
The measured value should fall at least within the range 1.0mV-2.0mV. If this is not the case, it can be trimmed using the potentiometer P1.
When taking these measurements, take care that there is no sig nal at the input and no load at the output. The measurements should be taken at room temperature and as soon as possible after switching on the device, as warming of the power amplifier could cause deviations.

Limiting the output signal

For this test 4 ohms (450W short term) load resistance is connected to the ***Speaker Out*** The input signal, a sine wave signal with a frequency of 1kHz and an amplitude of 0...5V(peak-to-peak), is applied to the ***Effects Return***. For these measurements, the necessary front panel settings are as follows

front

Master: 10

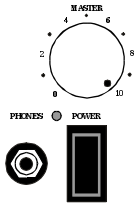


Fig. 5.: required settings

The signal at the ***Effects Return*** is slowly increased to 1,6V (peak-to-peak). See the table for the reaction of the input signal.

There should be no limiting of the output signal until the input signalreaches around 1,6V (peak-to-peak).
If the input signal is increased beyond this point, some limiting of the output signal should be observable on the oscilloscope.

Input	Output
1,6Vss 1kHz	ca.: 96Vss 34V_{eff} 1kHz 4Ω

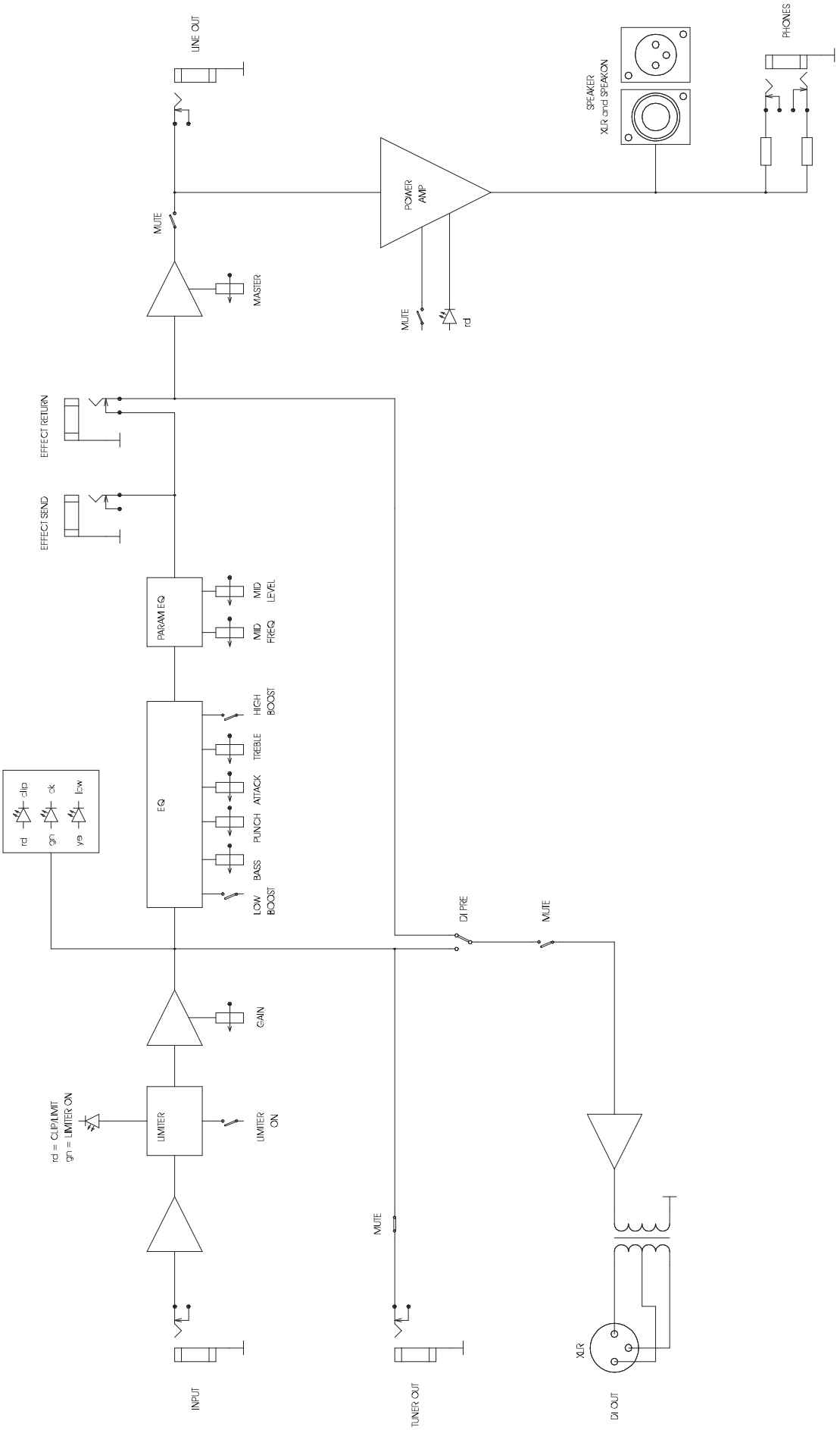
Frequency linearity

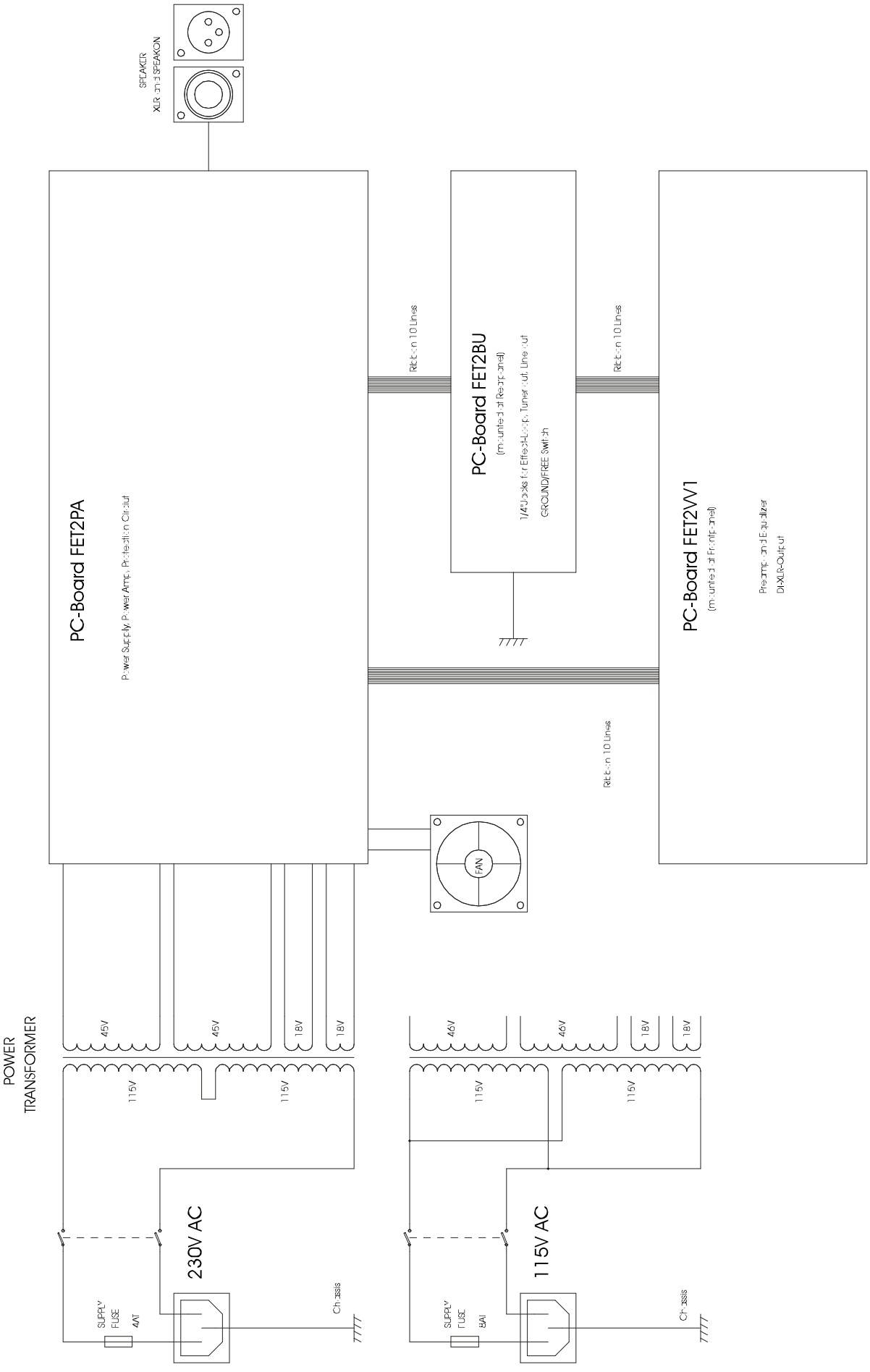
The frequency linearity is tested using a tone generator and voltage meter. The input signal is connected to the ***Effects Return*** socket on the rear panel of the ***Pro Fet II***. For the measurement to be carried out, it is essential that the signal be variable between 100Hz...1kHz...10kHz (switched is sufficient). A load resistance of 4 ohms (250W) and a voltage meter should be connected to the output. A 1kHz signal should then be directed to the ***Effects Return*** and the control adjusted so that an output signal of 28V(peak-to-peak) (10 Veff) is maintained.
The frequency of the input signal should be switched to 10Hz and then to 10kHz. The valu e of the resultant output signal should not deviate bymore than 10% from its initial value.

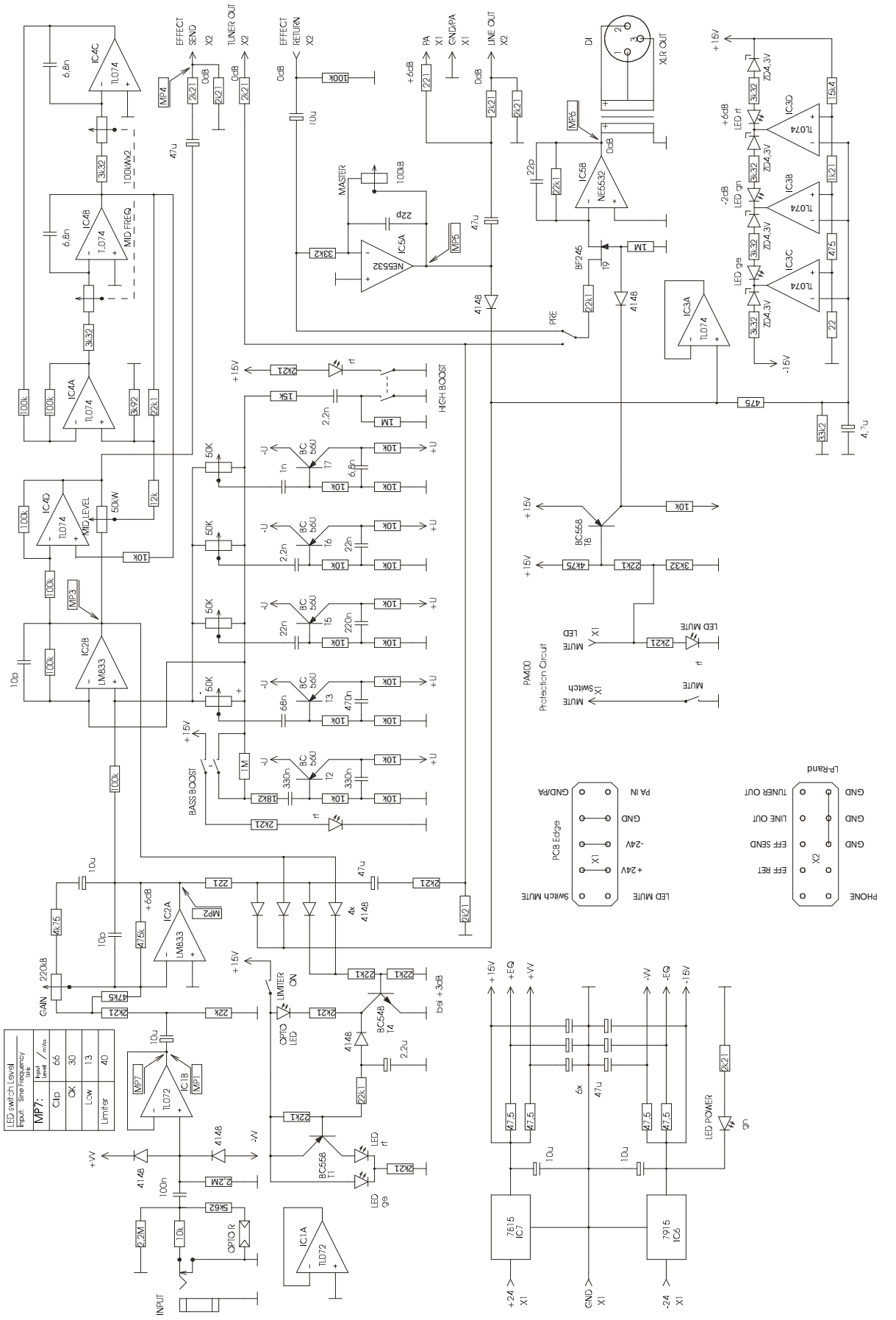
Ground / Lift

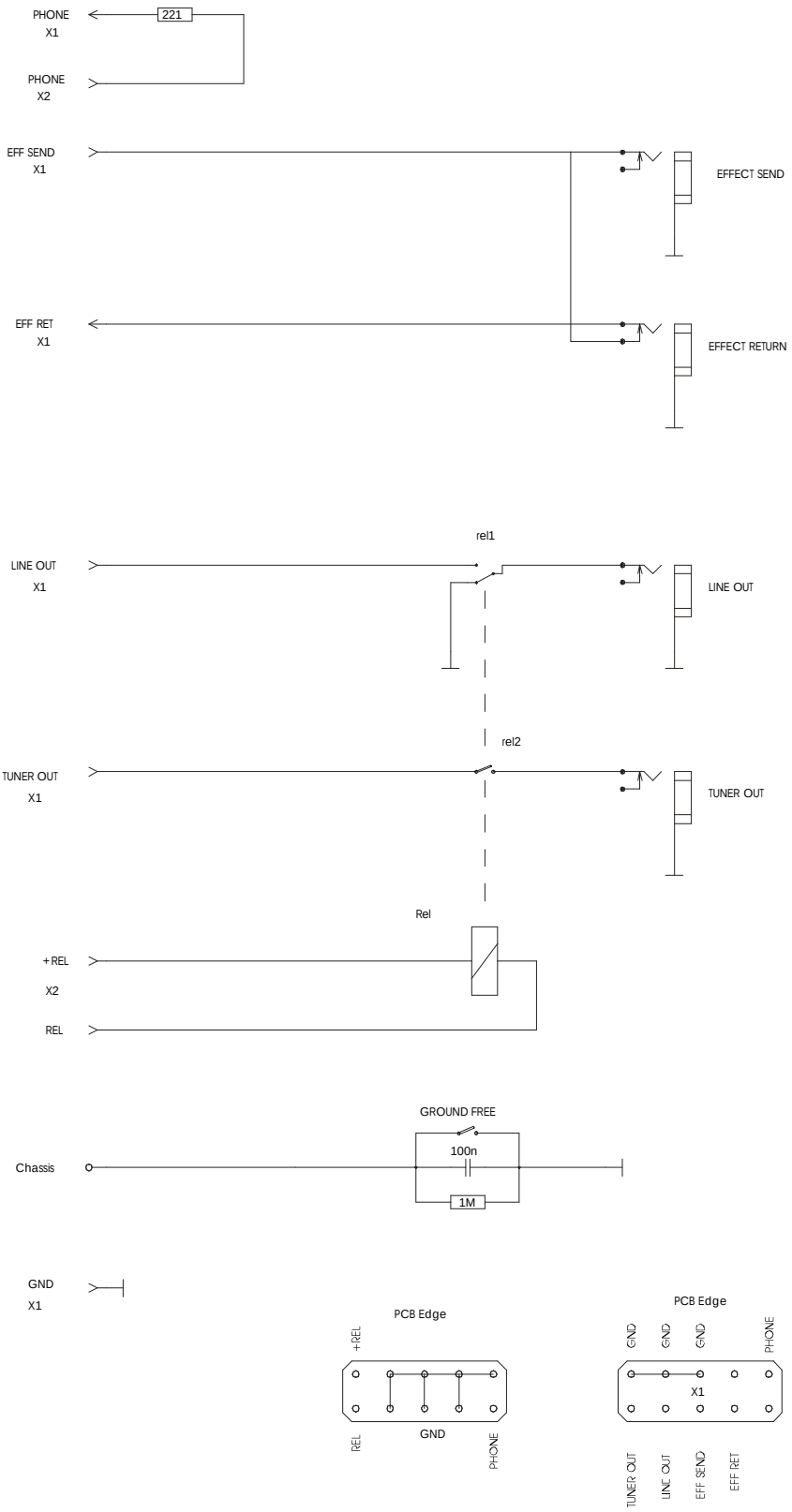
Finally the function of the *Ground / Lift* switch should be checked. For this purpose, a multimeter should be switched between the earths of the chassis and the device (Interior partition-*Speaker Out* (Minus)). The resistance values for the setting of the *Ground / Lift* are set out in the nearby table. The value in the *Ground* position can vary widely as a result of the transient resistance of the switching contacts. Consequently values up to 5 ohms are possible and normal.

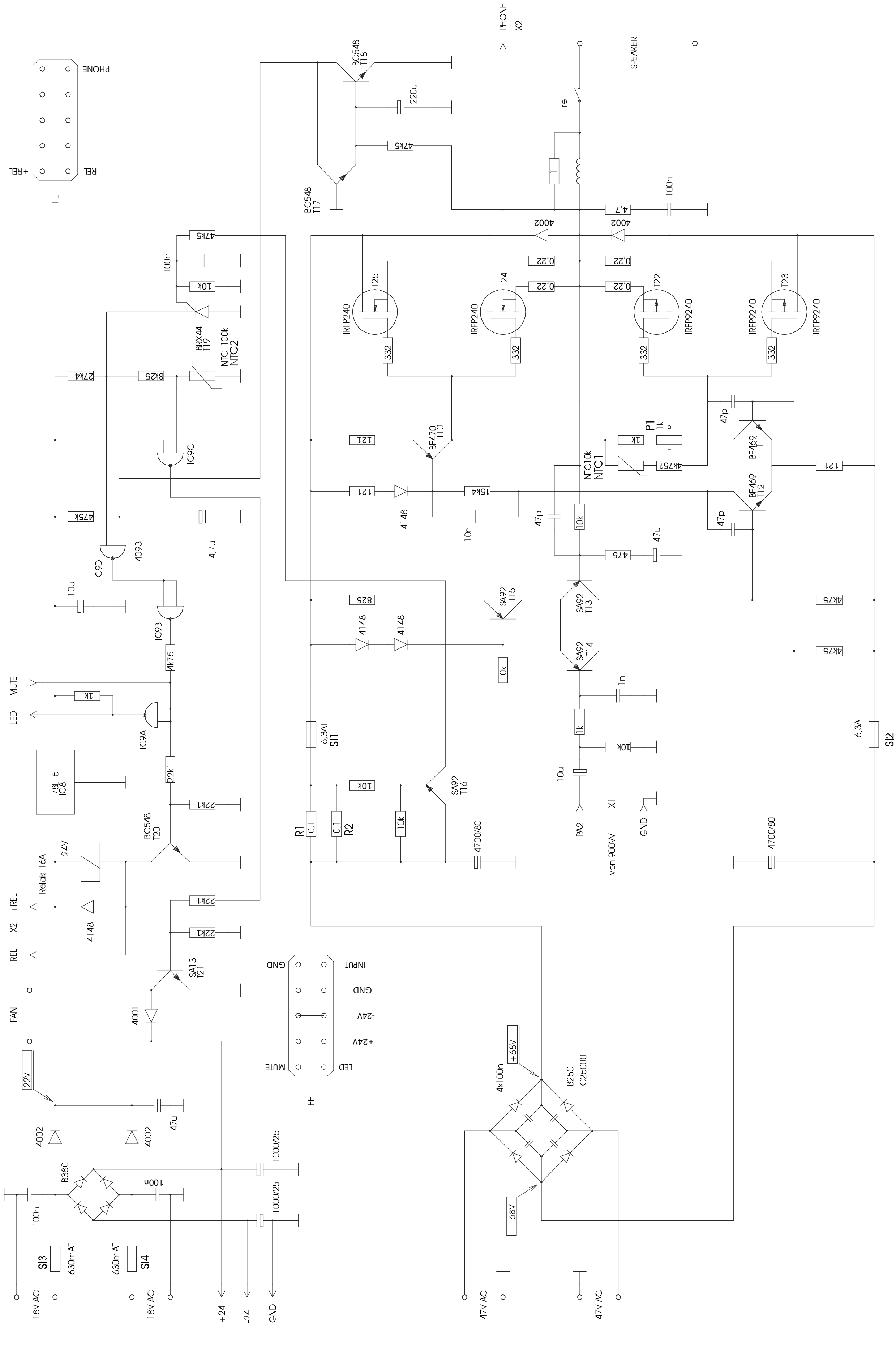
Ground	**0Ω**
Lift	**1MΩ**

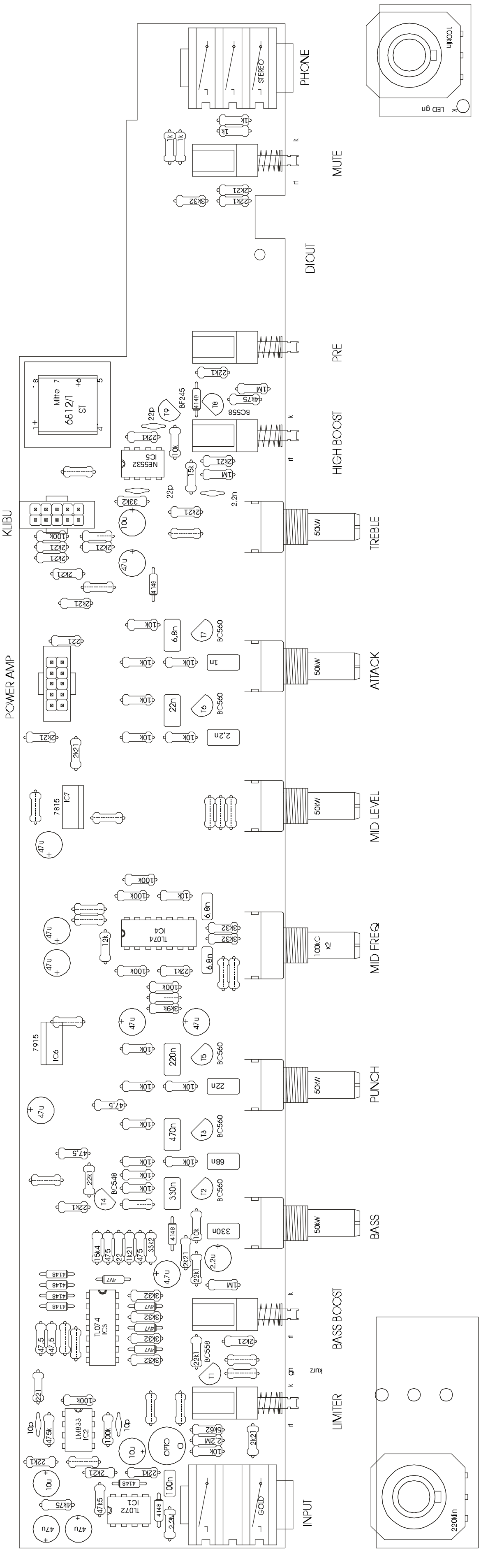

LINE OUT
PHONES
SPEAKER
XLR and SPEAKON
POWER
AMP
MUTE
MASTER
MUTE
rd
EFFECT RETURN
EFFECT SEND
PARAM EQ
MID
LEVEL
MID
FREQ
EQ
HIGH
BOOST
TREBLE
ATTACK
PUNCH
BASS
LOW
BOOST
rd
dip
gn
ok
ye
low
DJ PRE
MUTE
GAIN
rd = CLIP/LIMIT
gn = LIMITER ON
LIMITER
LIMITER
ON
MUTE
XLR
INPUT
TUNER OUT
DJ OUT

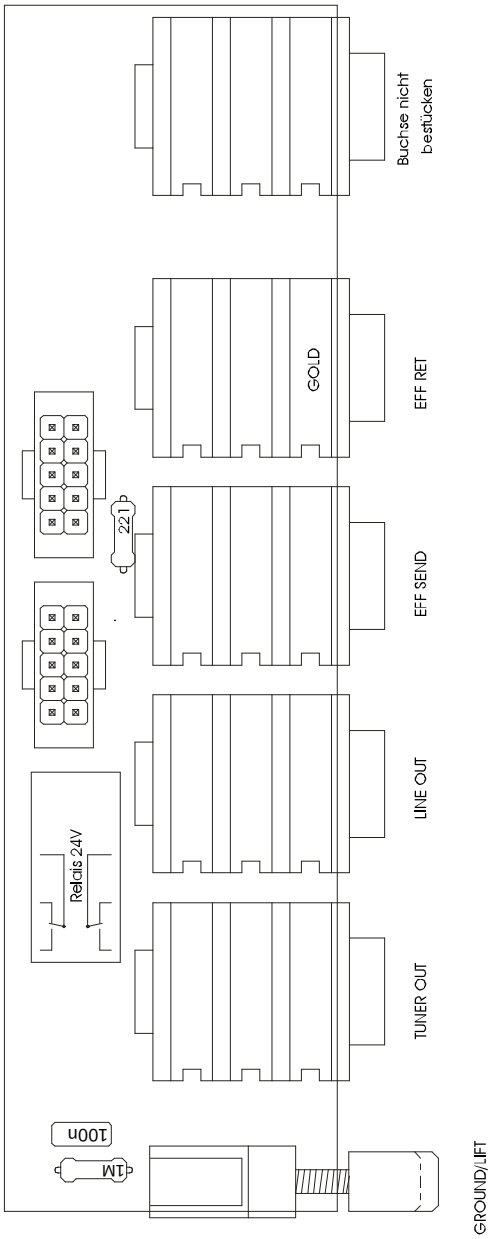

SPEAKER
XLR and SPEAKON
PC-Board FET2PA
Power Supply, Power Amp., Protection Circuit
Ribbon 10 Lines
PC-Board FET2BU
(mounted at Rear panel)
1/4" Jacks for Effect Loop, Tuner out, Line out
GROUND/FREE Switch
Ribbon 10 Lines
PC-Board FET2VV1
(mounted at Front panel)
Preamp and Equalizer
DI-XLR-Output
Ribbon 10 Lines
FAN
POWER
TRANSFORMER
45V
45V
18V
18V
115V
115V
46V
46V
18V
18V
115V
115V
230V AC
115V AC
SUPPLY
FUSE
4AT
8AT
Chassis
Chassis

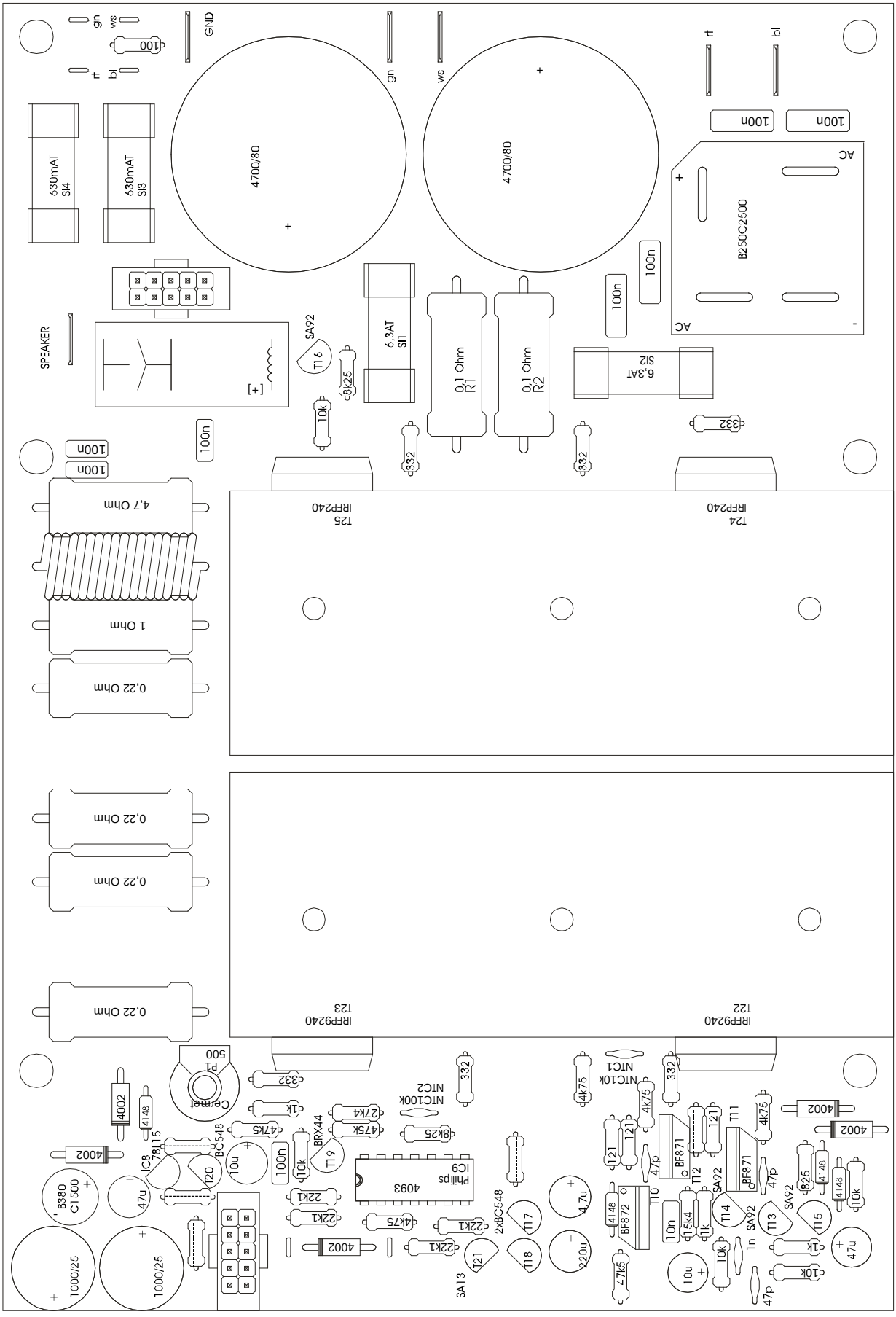

EFFECT SEND X2
TUNER OUT X2
EFFECT RETURN X2
PA X1
GND/PA X1
LINE OUT X2
DI
XLR OUT
IC4C TL074
IC4B TL074
IC4A TL074
IC4D TL074
IC2B LM833
IC2A LM833
IC1B TL072
IC1A TL072
IC5A NE5532
IC5B NE5532
IC3A TL074
IC3B TL074
IC3C TL074
IC3D TL074
MID_FREQ
MID_LEVEL
MASTER
PRE
HIGH BOOST
BASS BOOST
GAIN
LIMITER ON
OPTO LED
OPTO R
INPUT
LED switch Level
Input: Sine Frequency 1kHz
MP7:
Clip
OK
Low
Limiter
Input Level mVpp
66
30
13
40
PA400 Protection Circuit
MUTE Switch
MUTE LED
LED MUTE
PCB Edge
Switch MUTE
LED MUTE
+24V
-24V
GND
PA IN
GND/PA
L-Rand
PHONE
EFF RET
EFF SEND
LINE OUT
TUNER OUT
GND
LED POWER
7815 IC7
7915 IC6
+24 X1
GND X1
-24 X1

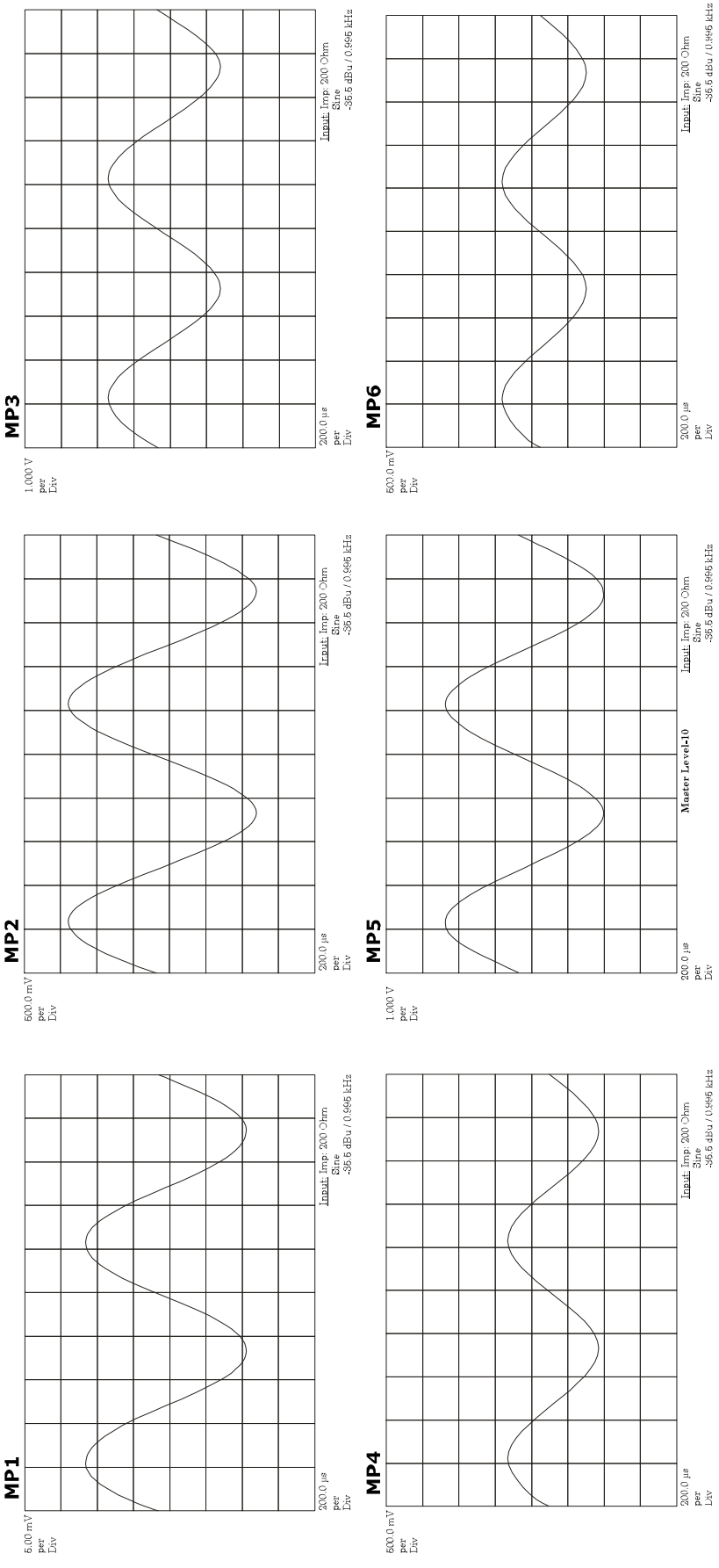

PHONE
X1
221
PHONE
X2
EFF SEND
X1
EFFECT SEND
EFF RET
X1
EFFECT RETURN
rel1
LINE OUT
X1
LINE OUT
rel2
TUNER OUT
X1
TUNER OUT
Rel
+REL
X2
REL
GROUND FREE
Chassis
100n
1M
GND
X1
PCB Edge
+REL
REL
GND
PHONE
PCB Edge
GND
GND
GND
PHONE
X1
TUNER OUT
LINE OUT
EFF SEND
EFF RET


PHONE
X2
SPEAKER
rel
FET
+REL
REL
BC548
T18
T17
220u
47k5
100n
4,7
4002
0,22
T25
T24
T22
T23
IRFP240
IRFP9240
332
BRX44
T19
NTC 100k
NTC2
27k4
8k25
10K
IC9C
IC9D
IC9B
IC9A
4093
475K
4,7u
10u
BF470
T10
BF469
T11
T12
P1
1k
121
4148
15k4
10n
47p
NTC10k
NTC1
4k75?
10k
475
47u
SA92
T15
T13
T14
T16
825
4k75
1n
1k
6,3AT
SI1
6,3A
SI2
R1
R2
0,1
4700/80
PA2
X1
GND
von 900W
MUTE
LED
1K
4k75
22k1
78L15
IC8
BC548
T20
24V
Relais 16A
+REL
X2
REL
4148
SA13
T21
FAN
4001
INPUT
-24V
+24V
22V
4002
47u
B380
100n
1000/25
SI3
SI4
630mAT
18V AC
+24
-24
+68V
-68V
4x100n
B250
C25000
47V AC


PHONE
MUTE
DIOUT
PRE
HIGH BOOST
TREBLE
ATTACK
MID LEVEL
MID FREQ
PUNCH
BASS
BASS BOOST
LIMITER
INPUT
KLIBU
POWER AMP

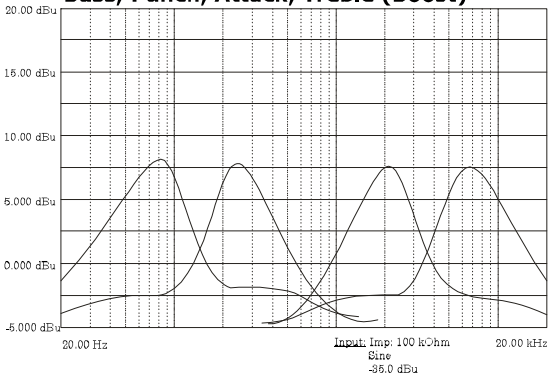

Buchse nicht bestücken
GOLD
EFF RET
EFF SEND
LINE OUT
TUNER OUT
221
Relais 24V
100n
1M
GROUND/LIFT


gn
ws
GND
100
rt
bl
4700/80
4700/80
630mAT
SI4
630mAT
SI8
100n
100n
AC
B250C2500
AC
+
-
SPEAKER
[+]
SA92
T16
8k25
10k
6,3AT
SI1
0,1 Ohm
R1
0,1 Ohm
R2
100n
6,3AT
SI2
332
332
332
100n
100n
4,7 Ohm
1 Ohm
0,22 Ohm
0,22 Ohm
0,22 Ohm
T25
IRFP240
T24
IRFP240
IRFP9240
T23
IRFP9240
T22
P1
500
Cermet
332
1k
47k5
27k4
47k5
BRX44
T19
NTC100k
NTC2
8k25
4093
Philips
IC9
4k75
NTC10k
NTC1
332
4k75
4002
4002
4002
4148
78L15
IC8
BC548
T20
10u
100n
10k
22k1
22k1
22k1
4k75
22k1
4002
2xBC548
T17
T18
T21
SA13
4,7u
220u
121
121
121
47p
BF871
T12
T10
BF872
4148
10n
15k4
1k
10u
47k5
T11
4k75
BF871
47p
T14
SA92
T13
SA92
1n
10k
47p
4002
825
4148
4148
10k
T15
1k
10k
47u
B380
C1500
1000/25
1000/25
47u

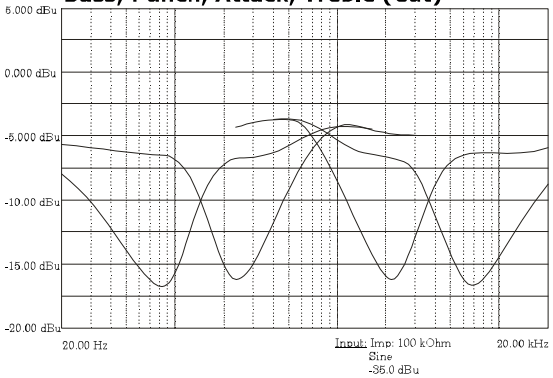

MP1
5.00 mV per Div
200.0 µs per Div
Input Imp: 200 Ohm
Sine
-36.6 dBu / 0.995 kHz
MP2
500.0 mV per Div
200.0 µs per Div
Input Imp: 200 Ohm
Sine
-36.6 dBu / 0.995 kHz
MP3
1.000 V per Div
200.0 µs per Div
Input Imp: 200 Ohm
Sine
-36.6 dBu / 0.995 kHz
MP4
500.0 mV per Div
200.0 µs per Div
Input Imp: 200 Ohm
Sine
-36.6 dBu / 0.995 kHz
MP5
1.000 V per Div
200.0 µs per Div
Input Imp: 200 Ohm
Sine
-36.6 dBu / 0.995 kHz
Master Level-10
MP6
500.0 mV per Div
200.0 µs per Div
Input Imp: 200 Ohm
Sine
-36.6 dBu / 0.995 kHz

Wenn mit einem Frequenz-Analyser gearbeitet wird sind die entsprechenden Eingangspegel den Kurven zu entnehmen.
Die Aufnahme der Kurven erfolgt ausschließlich am "*Effekt Send*" Ausgang.
The input Level is shown at the corresponding analyser graph.
Connect the frequency analyser to the "*Effekt Send*" Channel only.

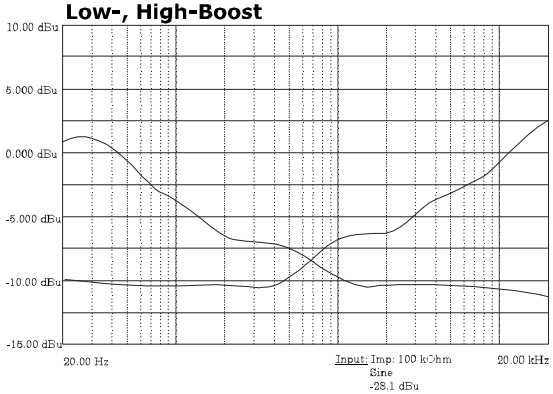
Bass, Punch, Attack, Treble (Boost)



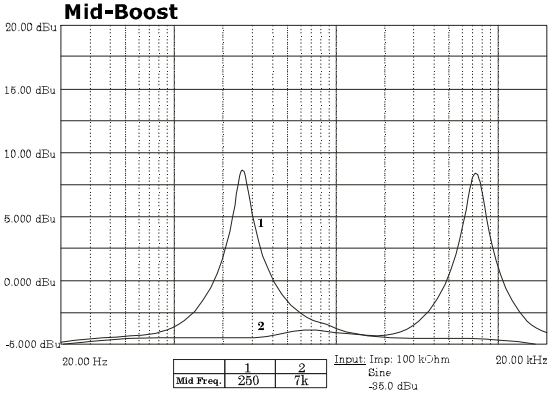
Bass, Punch, Attack, Treble (Cut)



Low-, High-Boost

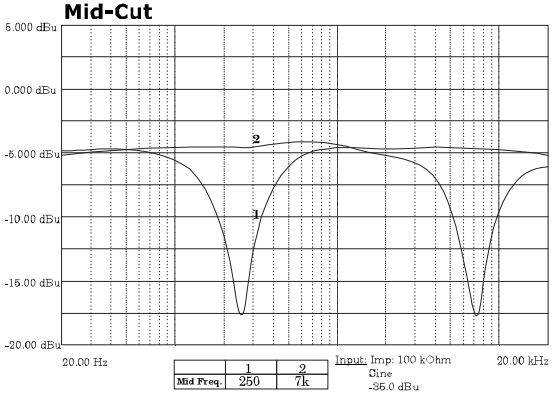


Mid-Boost



	1	2
Mid Freq.	250	7k

Mid-Cut



	1	2
Mid Freq.	250	7k